

U.S. Serial No. 10/500,814

Response to the Office Action of October 4, 2010

This listing of claims will replace all prior versions, and listings, of claims in the application:

The Status of the Claims

1. (Currently amended) A device for mini-invasive ultrasound treatment of an object comprising:

at least one therapeutic ultrasound transducer is arranged for treatment of the object by generating an ultrasonic field, the temperature focus of which is located in the object for heating thereof;

the therapeutic ultrasound transducer comprising an elongated probe defining a longitudinal direction and being adapted to be introduced into a body towards the object to be treated and which elongated probe comprises a front portion adapted to be located at, against, or in the object; and wherein the elongated probe comprises at least one transmitter element for generating the ultrasonic field for treatment of the object and for transmitting the ultrasonic field through the front portion,

wherein the transmitter element is arranged in a rear portion behind the front portion of the probe seen in the longitudinal direction, and wherein the front portion is configured to be thermally insulating, whereby during operation the transmitter element does not substantially heat the front portion during operation to a temperature sufficient to cause damage to the body,

wherein the front portion of the probe comprises a focusing device for focusing the ultrasonic field generated by the transmitter element, and

wherein the distance between the transmitter element and the focusing device for focusing the ultrasonic field in temperature focus is in the range of 0.5-20 centimeters.

2. (Canceled)

3. (Canceled)

4. (Previously presented) Device according to claim 3, wherein the distance between the transmitter element and the focusing device for focusing the ultrasonic field in temperature focus is in the range of 1–18 centimeters.

5. (Previously presented) Device according to claim 2, wherein the probe, in a space between the transmitter element and the focusing device for focusing the ultrasonic field in the temperature focus, is configured and/or comprises a material such that only small power losses in the ultrasonic field is obtained therein.

6. (Previously presented) Device according to claim 2, wherein the probe, in a space between the transmitter element and the focusing device for focusing the ultrasonic field in the temperature focus, comprises a material adapted to exert a focusing effect on the ultrasonic field together with the focusing device.

7. (Previously presented) Device according to claim 1, wherein an optical navigation device comprises at least one diagnostic camera arranged to generate at least one image of the anatomical structure of the treatment area within which the object to be treated is located.

8. (Previously presented) Device according to claim 7, wherein the diagnostic camera is an X-ray camera.

9. (Previously presented) Device according to claim 8, wherein the X-ray camera comprises a positioning device with markers which are intended to determine the position of the anatomical structure displayed in a monitor and present at the patient's disc to be treated.

10. (Previously presented) Device according to claim 9, wherein the monitor is arranged to display two X-ray photographs of said anatomical structure taken with the X-ray camera from two different locations.

11. (Previously presented) Device according to claim 7, wherein the diagnostic camera is a computerized tomography (CT) scanner which is arranged to produce images of the anatomical structure at the patient's object to be treated, which images being processed in a computer program (software) for obtaining a 3D-image in a monitor.

12. (Previously presented) Device according to claim 7, wherein the diagnostic camera is an X-ray camera or a MRI scanner which is arranged to produce images of the anatomical structure at the patient's object to be treated, which images being processed in a computer program (software) for obtaining a 3D-image in a monitor.

13. (Previously presented) Device according to claim 7, wherein the optical navigating device further comprises at least one signal receiving or signal sending unit which is intended to receive signals from and/or send signals to position transmitters on

- a) a reference device which has a set position relative to the object and
- b) the therapeutic ultrasound transducer such that the position thereof relative to said treatment area can be determined.

14. (Previously presented) Device according to claim 13, wherein the signal receiving or signal sending unit is arranged to receive or send signals in the form of infrared light or visible light or radio frequency electromagnetic waves or acoustic waves and that said position transmitters are arranged to send or receive signals in the form of infrared light or visible light or radio frequency electromagnetic waves or acoustic waves.

15. (Previously presented) Device according to claim 13 wherein the reference device is attached to a vertebra in the patient's vertebral column, preferably to the spinal process of said vertebra.

16. (Previously presented) Device according to claim 13, wherein the reference device comprises position transmitters consisting of metallic balls, preferably tantalum balls.
17. (Previously presented) Device according to claim 16, wherein the signal receiving or signal sending unit of the optical navigating device is at least one X-ray device.
18. (Previously presented) Device according to claim 7, wherein a tube with an associated inner portion is insertable towards the object to be treated and that said inner portion is intended to be replaced by the therapeutic ultrasound transducer.
19. (Previously presented) Device according to claim 18, wherein said tube is navigatable by means of the optical navigating device through the skin of the patient and brought into contact with the object to be treated.
20. (Previously presented) Device according to claim 1, wherein the temperature in the temperature focus of the therapeutic ultrasound transducer exceeds 45°C.
21. (Previously presented) Device according to claim 1, wherein a calibrating device is arranged for calibrating the power emitted by the therapeutic ultrasound transducer in the temperature focus of said therapeutic ultrasound transducer and/or the position of said temperature focus relative to the transmitter element of the therapeutic ultrasound transducer.
22. (Previously presented) Device according to claim 21, wherein the calibrating device is arranged to measure the emitted power by means of the echo of an ultrasound transmitter.
23. (Previously presented) Device according to claim 22, wherein the calibrating device is arranged to measure the echo from the therapeutic ultrasound transducer.

24. (Previously presented) Device according to claim 1, wherein the probe is provided with a cooling device comprising channels conducting cooling liquid around the tip of the probe, which tip is provided with a membrane.
25. (Previously presented) Device according to claim 1, wherein the device is arranged for mini-invasive ultrasound treatment of an object in the form of nucleus pulposus in the patient's disc.
26. (Previously presented) Device according to claim 25, wherein the therapeutic ultrasound transducer is arranged to be inserted through the patient's skin through a cut therein or by means of a cannula and brought into contact with the disc which annulus fibrosus is to be treated.
27. (Previously presented) Device according to claim 1, wherein the device is arranged for mini-invasive ultrasound treatment of objects in the form of ligaments in shoulders of knees.
28. (Previously presented) Device according to claim 1, wherein electronics are located in or attached to the rear portion of the probe and arranged on the outside of the patient during treatment.
29. (Previously presented) Use of a device according to claim 1, wherein the device is used in methods for treatment of an object in a patient's body, such as for treatment of nucleus pulposus in discs or ligaments in for example shoulders or knees.